General

Guideline Title

ACR Appropriateness Criteria® chronic back pain: suspected sacroiliitis/spondyloarthropathy.

Bibliographic Source(s)

Bernard SA, Kransdorf MJ, Beaman FD, Adler RS, Amini B, Appel M, Arnold E, Cassidy RC, Greenspan BS, Lee KS, Tuite MJ, Walker EA, Ward RJ, Wessell DE, Weissman BN, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness CriteriaÂ® chronic back pain: suspected sacroiliitis/spondyloarthropathy. Reston (VA): American College of Radiology (ACR); 2016. 10 p. [47 references]

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Recommendations

Major Recommendations

ACR Appropriateness Criteria®

Clinical Condition: Chronic Back Pain; Suspected Sacroiliitis/Spondyloarthropathy

Variant 1: Inflammatory sacroiliac or back symptoms. Suspected axial spondyloarthropathy. Initial evaluation.

Radiologic Procedure	Rating	Comments	RRL*
X-ray sacroiliac joints	9		☢☢
X-ray spine	9	Complementary examination to x-ray of the sacroiliac joints.	☢☢☢
CT sacroiliac joints without IV contrast	1		☢☢☢
CT sacroiliac joints with IV contrast	1		☢☢☢
CT sacroiliac joints without and with IV contrast	1		☢☢☢☢
CT spine without IV contrast	1		☢☢☢

Radiologic Procedure	Rating	Comments	RRL*
CT spine with IV contrast	1		☢☢☢
CT spine without and with IV contrast	1		☢☢☢☢
MRI sacroiliac joints without and with IV contrast	1		O
MRI sacroiliac joints without IV contrast	1		O
MRI spine without and with IV contrast	1		O
MRI spine without IV contrast	1		O
Tc-99m bone scan with SPECT spine	1		☢☢☢
FDG-PET/CT whole body	1		☢☢☢☢
US sacroiliac joints	1		O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			***Relative Radiation Level**

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

Variant 2: Inflammatory sacroiliac symptoms. Suspected axial spondyloarthropathy. Radiographs negative or equivocal.

Radiologic Procedure	Rating	Comments	RRL*
MRI sacroiliac joints without and with IV contrast	8	Contrast may be helpful in initial evaluation for inflammatory changes. MRI of the sacroiliac joints without contrast is a reasonable alternative examination.	O
MRI sacroiliac joints without IV contrast	8	Alternative to MRI with and without contrast.	O
CT sacroiliac joints without IV contrast	7	This procedure may be helpful in identifying subtle erosions, especially in patients unable to undergo MRI examination.	☢☢☢
Tc-99m bone scan with SPECT spine	4	This procedure may be helpful to localize source of pain, but generally not helpful for establishing an inflammatory diagnosis.	☢☢☢
CT sacroiliac joints with IV contrast	1		☢☢☢
CT sacroiliac joints without and with IV contrast	1		☢☢☢☢
FDG-PET/CT whole body	1		☢☢☢☢
US sacroiliac joints	1		O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			***Relative Radiation Level**

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

Variant 3: Inflammatory back pain symptoms. Suspected axial spondyloarthropathy. Radiographs negative or equivocal.

Radiologic Procedure	Rating	Comments	RRL*
MRI sacroiliac joints without IV contrast	8		O
CT spine without IV contrast	7	This procedure may be useful in patients unable to have an MRI.	☢☢☢
MRI spine without and with IV contrast	7	MR spine imaging is controversial. Some literature supports this. Benefits of contrast are unclear but may improve identification of subtle soft tissue inflammatory changes.	O
MRI spine without IV contrast	7	Alternative to MR spine imaging with contrast.	O
MRI sacroiliac joints without and with IV contrast	6	Contrast may be useful in initial evaluation.	O
Tc-99m bone scan with SPECT spine	3	This procedure may be helpful to localize source of pain, but generally not helpful for establishing an inflammatory diagnosis.	☢☢☢
CT spine with IV contrast	1	No advantage to using contrast in the literature.	☢☢☢
CT spine without and with IV contrast	1	No advantage to using contrast in the literature.	☢☢☢☢
FDG-PET/CT whole body	1		☢☢☢☢
US sacroiliac joints	1		O
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			***Relative Radiation Level**

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

Variant 4: Inflammatory sacroiliac symptoms. Suspected axial spondyloarthropathy. Negative radiographs and MRI of the sacroiliac joints.

Radiologic Procedure	Rating	Comments	RRL*
X-ray spine	9	Initial examination.	☢☢☢
MRI spine without IV contrast	8		O
CT spine without IV contrast	7		☢☢☢
MRI spine without and with IV contrast	5	This procedure may be appropriate but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating. Contrast generally not necessary, but may be helpful in some situations. Alternative to MR spine without contrast.	O
CT spine with IV contrast	1	No literature to support a benefit to contrast use.	☢☢☢
CT spine without and with IV contrast	1	No literature to support a benefit to contrast use.	☢☢☢☢
Tc-99m bone scan with SPECT spine	1	This procedure may be helpful to localize source of pain, but generally not helpful for establishing an inflammatory diagnosis.	☢☢☢
FDG-PET/CT whole body	1		☢☢☢☢
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9			***Relative**

Radiologic Procedure	Usually appropriate Rating	Comments	Radiation RRL* Level

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

Variant 5: Spine ankyloses. Suspected fracture.

Radiologic Procedure	Rating	Comments	RRL*
CT spine area of interest without IV contrast	9	Required as standard of care for exclusion of fracture in patients with ankylosis.	Varies
X-ray spine area of interest	8	If negative, additional imaging required.	Varies
MRI spine area of interest without IV contrast	8	This procedure should be performed in patients with neurologic symptoms.	O
Tc-99m bone scan with SPECT spine	2	This procedure may be helpful to localize source of pain, but generally not helpful for establishing an inflammatory diagnosis.	☢☢☢
CT spine area of interest with IV contrast	1		Varies
CT spine without and with IV contrast	1		Varies
MRI spine area of interest without and with IV contrast	1		O
FDG-PET/CT whole body	1		☢☢☢☢
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			***Relative Radiation Level**

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

Variant 6: Known axial spondyloarthropathy. Follow-up for treatment response or disease progression.

Radiologic Procedure	Rating	Comments	RRL*
X-ray sacroiliac joints	9		☢☢
X-ray spine area of interest	9	Complementary examination to evaluate symptomatic areas of the spine.	Varies
MRI sacroiliac joints and spine area of interest without IV contrast	8		O
CT sacroiliac joints and spine area of interest without IV contrast	5	CT is generally not performed, but may be helpful for complex anatomy.	Varies
MRI sacroiliac joints and spine area of interest without and with IV contrast	5	This procedure may be appropriate but there was disagreement among panel members on the appropriateness rating as defined by the panel's median rating. Contrast is generally not necessary, but may be useful in certain situations.	O
CT sacroiliac joints and spine area of interest with IV contrast	1		Varies
CT sacroiliac joints and spine without and with IV contrast	1		Varies
Tc-99m bone scan with SPECT spine	1	This procedure may be helpful to	☢☢☢
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9			***Relative**

Radiologic Procedure	Rating	Comments	RRL*
SPECT spine		localize source of pain, but generally not helpful for establishing an inflammatory diagnosis.	
FDG-PET/CT whole body	1		☢☢☢☢
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			***Relative Radiation Level**

Note: Abbreviations used in the table are listed at the end of the "Major Recommendations" field.

Summary of Literature Review

Introduction/Background

The axial spondyloarthropathies (axSpAs) are a group of inflammatory arthritides that include ankylosing spondylitis, psoriatic arthritis, reactive arthritis, and inflammatory bowel disease related spondyloarthropathies. These axSpAs involve the sacroiliac (SI) joints and/or the spine. It is estimated that as much as 5% of chronic back pain is caused by an underlying axSpA. Symptoms may begin in childhood or early adulthood and can lead to loss of mobility and function. As there is no one pathognomonic test, the diagnosis of axSpAs is often challenging and is based on a combination of physical exam, biological data (human leukocyte antigen [HLA-B27], C-reactive protein), and imaging findings. An axSpA typically presents prior to 45 years of age. The pain is chronic (3 months or more duration) and insidious in onset, with "inflammatory symptoms" that, depending of the criteria used, can include morning stiffness, pain that improves with exercise but not rest, pain that awakens in the second half of the night, and alternating buttock pain. There has been an evolution of the diagnostic criteria for the axSpAs from originally requiring conventional radiographic evidence of sacroiliitis as part of the modified New York Criteria to the Assessment of SpondyloArthritis International Society (ASAS) classification system that now includes combinations of clinical findings with or without imaging evidence of sacroiliitis. The most pronounced change in the classification has been the inclusion of SI inflammatory lesions on magnetic resonance imaging (MRI) as an imaging means of early identification of patients with "pre-radiographic" spondyloarthropathy. Effective new biological therapies, such as the tumor necrosis factor-α antagonists, which have the potential to arrest disease progression and prevent the development of disability, make early diagnosis and treatment prior to radiographic joint damage essential.

Overview of Imaging Modalities

Radiographs are recommended as the first imaging modality for evaluation in cases of suspected axSpA. The main limitation of conventional radiography is a low sensitivity for detecting abnormalities in the early stages of the disease. Radiographic findings represent the structural consequences of inflammatory changes and often lag behind the onset of clinical symptoms by 7 or more years.

Current diagnostic algorithms for axSpAs recommend MRI of the SI joints as the next appropriate imaging method when there is an absence of radiographic findings to help establish the diagnosis. Fluid-sensitive MR sequences such as T2-weighted fat-saturated or short tau inversion recovery (STIR) allow identification of the characteristic bone marrow lesions and areas of soft-tissue inflammatory change. Intravenous gadolinium-diethylenetriamine pentaacetic acid (DTPA) contrast-enhanced, fat-saturated, T1-weighted images may allow for further evaluation of inflammation in subchondral bone and adjacent soft tissues as well as differentiation of synovitis from fluid in the joints. MR inflammatory changes have been shown to be predictive of later progression to radiographic erosive disease as well as correlate with a likelihood of response to treatment.

In patients unable to undergo MRI, computed tomography (CT) may be helpful, demonstrating an improved sensitivity over conventional radiographs for detection of subtle bone erosions and reparative changes. CT allows better assessment of the complex anatomy of the SI joints as well as of early enthesitis-related bone production in the posterior elements and costovertebral articulations of the spine. CT, however, lacks sensitivity for the direct inflammatory changes of early axSpA prior to erosion and thus remains primarily an adjunct imaging method.

Bone scintigraphy has the potential for identifying increased bone turnover at the SI joints or spine associated with the axSpAs but lacks sufficient specificity for establishing a diagnosis of inflammatory sacroiliitis. If bone scintigraphy is used for symptom localization, given the complexity of the anatomy, it should include single-photon emission computed tomography (SPECT) imaging. There is limited literature evaluating the role of fluorine-18-2-fluoro-2-deoxy-D-glucose (FDG) positron emission tomography (PET)/CT imaging for evaluation of the active inflammation in axSpA. Although the potential for whole-body screening is attractive, and there may be utility in screening for active enthesitis, the body of literature is too limited currently for inclusion in the current general imaging recommendations. Ultrasound (US) with Doppler imaging continues to increase in use in rheumatologic practices and is currently applied to the SpAs in detection of peripheral joint involvement and enthesitis. A few studies have shown potential for the use of US with Doppler imaging of the SI joints both for initial screening for inflammation and for follow-up of treatment response. Although this may develop into an inexpensive and useful diagnostic tool, more research is needed before inclusion in the current algorithm for general diagnostic imaging recommendations.

Discussion of Imaging Modalities by Variant

Variant 1: Inflammatory Sacroiliac or Back Symptoms. Suspected Axial Spondyloarthropathy. Initial Evaluation

The initial imaging should begin with radiographic evaluation of the SI joints. For imaging of the SI joints, a standard anteroposterior (AP) radiograph of the pelvis may be sufficient, with an additional AP view with 30° to 45° cephalad angulation of the x-ray tube as well as bilateral 30º oblique views often used to minimize the overlap of structures. The ASAS recommends the whole pelvis with the hip joints be included as part of the initial screening AP imaging. Cervical, thoracic and lumbar spine radiographs with a minimum of an initial lateral projection should be obtained based on the regions of the patient's clinical symptoms. Additional oblique views of the spine may be helpful for further evaluation of the facet joints. Decisions for advanced imaging should be made based on the results of radiography and the clinical need for additional assessment.

Variant 2: Inflammatory Sacroiliac Symptoms. Suspected Axial Spondyloarthropathy. Radiographs Negative or Equivocal

CT of the SI joints without contrast may be helpful in cases when equivocal radiographic abnormalities exist, allowing identification of subtle erosions and soft-tissue ossification. In the absence of radiographic findings, MRI of the SI joints is the best examination for the assessment of acute inflammatory changes. In addition to T1 sequences, the MRI should include fat-suppressed fluid-sensitive sequences such as T2-weighted fat-suppressed or STIR images. Intravenous gadolinium contrast-enhanced, T1-weighted, fat-saturated sequences may improve detection of subtle inflammatory lesions and differentiation of synovitis from joint fluid during the initial evaluation for axSpA. However, contrast-enhanced imaging has not been shown to significantly increase the diagnostic accuracy of MRI for sacroiliitis. The use of contrast must be weighed against the potential disadvantages of increased cost, need for intravenous access, and the potential risk of nephrogenic systemic fibrosis or contrast reaction. As discussed in the overview of imaging modalities section above, although quantitative bone scintigraphy, PET/CT, and US may have application on a case-by-case basis and may be included in research protocols, there is not enough literature to support their inclusion in the general recommendations for imaging at this time.

Variant 3: Inflammatory Back Pain Symptoms. Suspected Axial Spondyloarthropathy. Radiographs Negative or Equivocal

Variant 4: Inflammatory Sacroiliac Symptoms. Suspected Axial Spondyloarthropathy. Negative Radiographs and MRI of the Sacroiliac Joints

Isolated spine inflammatory involvement in the setting of normal SI joints has in the past been considered a rare occurrence but has since been recognized more frequently (6% to 23%) on MR examinations. Lateral radiographs at minimum of the cervical and lumbar spine, if not already performed,

may allow identification of findings that can help establish a diagnosis. CT may allow better visualization of subtle erosive changes or enthesopathic bone formation in the posterior elements or for evaluation of thoracic spine disease. If radiographs are normal and disease is unable to be confirmed by MRI of the sacroiliac joints, spine MRI may be helpful to support diagnosis and allow the patient access to tumor necrosis factor-α antagonist medications. Although not currently included in the ASAS classification of axSpA, criteria have been proposed for defining the number and severity of classic lesions on spine MRI that are highly suggestive of axSpAs. Sagittal imaging has been demonstrated as the best imaging plane for evaluation of axSpA spinal lesions. Note: *The spine MRI examination needs to include fluid-sensitive sequences (STIR or T2-weighted fat-saturated) to allow visual identification of the acute inflammatory findings in bone, joints, and soft tissues*. This point is made because standard spine MRI protocols for evaluation of disc disease may not include the fat suppression of the T2 imaging necessary for sensitivity for the inflammatory features of the axSpAs. Gadolinium enhancement is not required but may help in initial evaluation, improving conspicuity of inflammatory changes, especially in the discs, facet joints and entheses. (See the National Guideline Clearinghouse [NGC] summary of the ACR Appropriateness Criteria® low back pain.)

Variant 5: Spine Ankyloses. Suspected Fracture

AxSpA is associated with the development of both osteoporosis and ankylosis of the spine. Spinal fractures in the setting of ankylosis are frequently from low-energy mechanisms, such as a fall from standing or even in the absence of recognizable trauma as presumed insufficiency fractures. Many of these fractures involve all 3 columns of the spine and are unstable, with a high associated rate of neurologic injury. Radiographs are an inexpensive initial imaging method of evaluation but have a poor sensitivity for the presence or extent of fracture. CT with multiplanar reformatted images is necessary for exclusion of fracture of the spine in a patient with ankylosis and pain following any report of trauma. If neurological symptoms are present, MRI without contrast would be recommended for the evaluation for spinal cord, nerve root and ligamentous injuries. (See the NGC summary of the ACR Appropriateness Criteria® suspected spine trauma.)

Variant 6: Known Axial Spondyloarthropathy. Follow-up for Treatment Response or Disease Progression

In conjunction with clinical examination and laboratory biomarkers, conventional radiographs of the SI joints and symptomatic regions of the spine are the primary method of following structural progression of disease. The frequency of radiographic monitoring should be based on the patient's individual symptoms, with a general recommendation of no more frequently than every 2 years. MRI may be helpful for evaluation of persistent inflammation as a determination of treatment response. Gadolinium-enhanced imaging is not needed to identify active inflammatory lesions, which are equally well identified on fluid-sensitive fat-suppressed imaging (T2- weighted fat-saturated or STIR imaging).

Summary of Recommendations

- Initial evaluation for inflammatory arthropathy is best performed with radiographs of the sacroiliac joints and symptomatic areas of the spine.
- MRI plays an essential role in identifying early inflammatory disease when radiographic evidence of disease is absent and should begin with sacroiliac joint imaging.
- MRI of the spine may be helpful in establishing the diagnosis when other imaging is negative. The MRI request should indicate that the examination is being performed to evaluate for possible axial spondyloarthropathy as the imaging sequences may need to be modified.
- Gadolinium-enhanced MRI may be helpful at initial assessment, especially when nonenhanced MR images are normal. Intravenous contrast is probably not needed for follow-up MR imaging outside of research protocols or for specific patient indications.
- Patients with ankylosis of the spine have a high incidence of unstable fractures that may occur from seemingly minor trauma. As a result, a high clinical suspicion is needed when these patients present with spine pain and multiplanar CT is required for exclusion of fracture.

Abbreviations

CT, computed tomography
IV, intravenous
FDG-PET, fluorine-18-2-fluoro-2-deoxy-D-glucose positron-emission tomography
MR, magnetic resonance
MRI, magnetic resonance imaging
SPECT, single-photon emission computed tomography
Tc-99m, technetium-99 metastable
US, ultrasound

Relative Radiation Level Designations

Relative Radiation Level*	Adult Effective Dose Estimate Range	Pediatric Effective Dose Estimate Range
O	0 mSv	0 mSv
☢	<0.1 mSv	<0.03 mSv
☢☢	0.1-1 mSv	0.03-0.3 mSv
☢☢☢	1-10 mSv	0.3-3 mSv
☢☢☢☢	10-30 mSv	3-10 mSv
☢☢☢☢☢	30-100 mSv	10-30 mSv
*RRL assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (e.g., region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as "Varies."		

Clinical Algorithm(s)

Algorithms were not developed from criteria guidelines.

Scope

Disease/Condition(s)

Chronic back pain caused by suspected sacroiliitis/spondyloarthropathy

Guideline Category

Diagnosis

Evaluation

Management

Treatment

Clinical Specialty

Family Practice

Internal Medicine

Nuclear Medicine

Radiology

Rheumatology

Intended Users

Advanced Practice Nurses

Health Plans

Hospitals

Managed Care Organizations

Physician Assistants

Physicians

Students

Utilization Management

Guideline Objective(s)

To evaluate the appropriateness of imaging procedures for patients with chronic back pain caused by suspected sacroiliitis/spondyloarthropathy

Target Population

Patients with chronic back pain caused by suspected sacroiliitis/spondyloarthropathy

Interventions and Practices Considered

1. X-ray
    - Sacroiliac joints
    - Spine
    - Spine area of interest
2. Computed tomography (CT)
    - Sacroiliac joints without intravenous (IV) contrast
    - Sacroiliac joints with IV contrast
    - Sacroiliac joints without and with IV contrast
    - Spine without IV contrast
    - Spine with IV contrast
    - Spine without and with IV contrast
    - Spine area of interest without IV contrast
    - Spine area of interest with IV contrast
    - Spine area of interest without and with IV contrast
    - Sacroiliac joints and spine area of interest without IV contrast
    - Sacroiliac joints and spine area of interest with IV contrast
    - Sacroiliac joints and spine area of interest without and with IV contrast
3. Magnetic resonance imaging (MRI)
    - Sacroiliac joints without and with IV contrast
    - Sacroiliac joints without IV contrast
    - Spine without and with IV contrast
    - Spine without IV contrast

    - Spine area of interest without IV contrast
    - Spine area of interest without and with IV contrast
    - Sacroiliac joints and spine area of interest without IV contrast
    - Sacroiliac joints and spine area of interest without and with IV contrast
4. Technetium (Tc)-99m bone scan with single-photon emission computed tomography (SPECT), spine
5. Fluorine-18-2-fluoro-2-deoxy-D-glucose positron-emission tomography (FDG-PET)/CT, whole body
6. Ultrasound (US), sacroiliac joints

Major Outcomes Considered

- Utility of imaging modalities in evaluating patients with chronic back pain caused by suspected sacroiliitis/spondyloarthropathy
- Sensitivity, specificity, and diagnostic accuracy of imaging modalities in evaluating chronic back pain caused by suspected sacroiliitis/spondyloarthropathy

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search Summary

A literature search was conducted in March 2014 and updated in November 2015 to identify evidence for the *ACR Appropriateness Criteria® Chronic Back Pain Suspected Sacroiliitis Spondyloarthropathy* topic. Using the search strategies described in the literature search companion (see the "Availability of Companion Documents" field), 320 articles were found. Twenty-six articles were used in the topic. Two hundred ninety-four articles were not used due to either poor study design, the articles were not relevant or generalizable to the topic, or the results were unclear, misinterpreted, or biased.

The author added 21 citations from bibliographies, Web sites, or books that were not found in the literature search.

See also the American College of Radiology (ACR) Appropriateness Criteria® literature search process document (see the "Availability of Companion Documents" field) for further information.

Number of Source Documents

The literature search conducted in March 2014 and updated in November 2015 identified 26 articles that were used in the topic. The author added 21 citations from bibliographies, Web sites, or books that were not found in the literature search.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Definitions of Study Quality Categories

Category 1 - The study is well-designed and accounts for common biases.

Category 2 - The study is moderately well-designed and accounts for most common biases.

Category 3 - The study has important study design limitations.

Category 4 - The study or source is not useful as primary evidence. The article may not be a clinical study, the study design is invalid, or conclusions are based on expert consensus.

> The study does not meet the criteria for or is not a hypothesis-based clinical study (e.g., a book chapter or case report or case series description);
>
> *Or*
>
> The study may synthesize and draw conclusions about several studies such as a literature review article or book chapter but is not primary evidence;
>
> *Or*
>
> The study is an expert opinion or consensus document.

Category M - Meta-analysis studies are not rated for study quality using the study element method because the method is designed to evaluate individual studies only. An "M" for the study quality will indicate that the study quality has not been evaluated for the meta-analysis study.

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The topic author assesses the literature then drafts or revises the narrative summarizing the evidence found in the literature. American College of Radiology (ACR) staff drafts an evidence table based on the analysis of the selected literature. These tables rate the study quality for each article included in the narrative.

The expert panel reviews the narrative, evidence table and the supporting literature for each of the topic-variant combinations and assigns an appropriateness rating for each procedure listed in the variant table(s). Each individual panel member assigns a rating based on his/her interpretation of the available evidence.

More information about the evidence table development process can be found in the ACR Appropriateness Criteria® Evidence Table Development document (see the "Availability of Companion Documents" field).

Methods Used to Formulate the Recommendations

Expert Consensus (Delphi)

Description of Methods Used to Formulate the Recommendations

Rating Appropriateness

The American College of Radiology (ACR) Appropriateness Criteria (AC) methodology is based on the

RAND Appropriateness Method. The appropriateness ratings for each of the procedures or treatments included in the AC topics are determined using a modified Delphi method. A series of surveys are conducted to elicit each panelist's expert interpretation of the evidence, based on the available data, regarding the appropriateness of an imaging or therapeutic procedure for a specific clinical scenario. The expert panel members review the evidence presented and assess the risks or harms of doing the procedure balanced with the benefits of performing the procedure. The direct or indirect costs of a procedure are not considered as a risk or harm when determining appropriateness. When the evidence for a specific topic and variant is uncertain or incomplete, expert opinion may supplement the available evidence or may be the sole source for assessing the appropriateness.

The appropriateness is represented on an ordinal scale that uses integers from 1 to 9 grouped into three categories: 1, 2, or 3 are in the category "usually not appropriate" where the harms of doing the procedure outweigh the benefits; and 7, 8, or 9 are in the category "usually appropriate" where the benefits of doing a procedure outweigh the harms or risks. The middle category, designated "may be appropriate," is represented by 4, 5, or 6 on the scale. The middle category is when the risks and benefits are equivocal or unclear, the dispersion of the individual ratings from the group median rating is too large (i.e., disagreement), the evidence is contradictory or unclear, or there are special circumstances or subpopulations which could influence the risks or benefits that are embedded in the variant.

The ratings assigned by each panel member are presented in a table displaying the frequency distribution of the ratings without identifying which members provided any particular rating. To determine the panel's recommendation, the rating category that contains the median group rating without disagreement is selected. This may be determined after either the first or second rating round. If there is disagreement after the second rating round, the recommendation is "May be appropriate."

This modified Delphi method enables each panelist to articulate his or her individual interpretations of the evidence or expert opinion without excessive influence from fellow panelists in a simple, standardized, and economical process. For additional information on the ratings process see the Rating Round Information document.

Additional methodology documents, including a more detailed explanation of the complete topic development process and all ACR AC topics can be found on the ACR Web site (see also the "Availability of Companion Documents" field).

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The recommendations are based on analysis of the current medical evidence literature and the application of the RAND/UCLA appropriateness method and expert panel consensus.

Summary of Evidence

Of the 47 references cited in the *ACR Appropriateness Criteria® Chronic Back Pain–Suspected Sacroiliitis/Spondyloarthropathy* document, 46 are categorized as diagnostic references including 14 good quality studies, and 12 quality studies that may have design limitations. Additionally, 1 reference is categorized as a well designed therapeutic study. There are 20 references that may not be useful as primary evidence.

While there are references that report on studies with design limitations, 15 well designed or good quality studies provide good evidence.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Selection of appropriate radiologic imaging procedures for evaluation of patients with chronic back pain caused by suspected sacroiliitis/spondyloarthropathy

Potential Harms

The use of contrast must be weighed against the potential disadvantages of increased cost, need for intravenous access, and the potential risk of nephrogenic systemic fibrosis or contrast reaction.

Relative Radiation Level Information

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level (RRL) indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Patients in the pediatric age group are at inherently higher risk from exposure, both because of organ sensitivity and longer life expectancy (relevant to the long latency that appears to accompany radiation exposure). For these reasons, the RRL dose estimate ranges for pediatric examinations are lower as compared to those specified for adults. Additional information regarding radiation dose assessment for imaging examinations can be found in the American College of Radiology (ACR) Appropriateness Criteria® Radiation Dose Assessment Introduction document (see the "Availability of Companion Documents" field).

Qualifying Statements

Qualifying Statements

- The American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and

treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those examinations generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

- ACR seeks and encourages collaboration with other organizations on the development of the ACR Appropriateness Criteria through society representation on expert panels. Participation by representatives from collaborating societies on the expert panel does not necessarily imply individual or society endorsement of the final document.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Living with Illness

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Bernard SA, Kransdorf MJ, Beaman FD, Adler RS, Amini B, Appel M, Arnold E, Cassidy RC, Greenspan BS, Lee KS, Tuite MJ, Walker EA, Ward RJ, Wessell DE, Weissman BN, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness CriteriaÂ® chronic back pain: suspected sacroiliitis/spondyloarthropathy. Reston (VA): American College of Radiology (ACR); 2016. 10 p. [47 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016

Guideline Developer(s)

American College of Radiology - Medical Specialty Society

Source(s) of Funding

American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

Guideline Committee

Committee on Appropriateness Criteria, Expert Panel on Musculoskeletal Imaging

Composition of Group That Authored the Guideline

Panel Members: Stephanie A. Bernard, MD (*Principal Author*); Mark J. Kransdorf, MD (*Panel Chair*); Francesca D. Beaman, MD (*Panel Vice-Chair*); Ronald S. Adler, MD, PhD; Behrang Amini, MD, PhD; Marc Appel, MD; Erin Arnold, MD; R. Carter Cassidy, MD; Bennett S. Greenspan, MD, MS; Kenneth S. Lee, MD, MBA; Michael J. Tuite, MD; Eric A. Walker, MD; Robert J. Ward, MD; Daniel E. Wessell, MD; Barbara N. Weissman, MD (*Specialty Chair*)

Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the American College of Radiology (ACR) Web site .

Availability of Companion Documents

The following are available:

ACR Appropriateness Criteria®. Overview. Reston (VA): American College of Radiology; 2015 Oct. 3 p. Available from the American College of Radiology (ACR) Web site .

ACR Appropriateness Criteria®. Literature search process. Reston (VA): American College of Radiology; 2015 Feb. 1 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Evidence table development. Reston (VA): American College of Radiology; 2015 Nov. 5 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Topic development process. Reston (VA): American College of Radiology; 2015 Nov. 2 p. Available from the ACR Web site .

ACR Appropriateness Criteria®. Rating round information. Reston (VA): American College of

Radiology; 2015 Apr. 5 p. Available from the ACR Web site .
ACR Appropriateness Criteria®. Radiation dose assessment introduction. Reston (VA): American College of Radiology; 2015 Sep. 3 p. Available from the ACR Web site .
ACR Appropriateness Criteria®. Manual on contrast media. Reston (VA): American College of Radiology; 2016. 128 p. Available from the ACR Web site .
ACR Appropriateness Criteria®. Procedure information. Reston (VA): American College of Radiology; 2016 May. 2 p. Available from the ACR Web site .
ACR Appropriateness Criteria® chronic back pain: suspected sacroiliitis/spondyloarthropathy. Evidence table. Reston (VA): American College of Radiology; 2016. 21 p. Available from the ACR Web site .
ACR Appropriateness Criteria® chronic back pain: suspected sacroiliitis/spondyloarthropathy. Literature search. Reston (VA): American College of Radiology; 2016. 2 p. Available from the ACR Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI Institute on September 29, 2016.

Copyright Statement

Disclaimer

NGC Disclaimer

The National Guideline Clearinghouseâ„¢ (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria.

NGC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or clinical efficacy or effectiveness of the clinical practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI Institute, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.